

MALARIA VACCINE PROJECT

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OUR HISTORY

In 2015 Sam and PDG Sandy Doumany attended a Rotary Against Malaria Conference, with Dr Danielle Stanisic from the Institute for Glycomics as the Guest Speaker. Danielle spoke about Malaria Vaccine research led by herself and Professor Michael Good AO at the Institute. She mentioned that their Laboratory needed a Separator which would cost \$8000.

Sam took that on board and approached PDG Graham Jones to see if the money required could be raised. Within a week, Graham, Sam and other Rotarians had raised the funds.

The Griffith Rotary Satellite Club was in the formation period and the cheque was presented to Dr Danielle Stanisic (a prospective member) at the next meeting. The Rotarians felt this sent a message to new members:

“This is the power of Rotary”

After learning more about Professor Michael Good and Dr Danielle Stanisic’s research journey, a core of Rotarians developed a passion to be part of the quest to save the lives of so many men, women and children and eliminate Malaria from the world.

In 2016 Gerard Brennan had discussions with the Governor General’s Office in Canberra which led to the Governor General, Sir Peter Cosgrove, launching the Malaria Vaccine Project at a function in the Institute for Glycomics on 27 March 2017.

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Advancement Manager
Institute for Glycomics

CHAIR MESSAGE



PDG Sandy Doumany OAM
CHAIR



Welcome to the third newsletter for 2023.

It is incredible how swiftly festive season discussions have commenced as we encroach on the ramp to end of year.

Professor Michael Good AO, Associate Professor Danielle Stanisic and the wider research team have continued to demonstrate focused dedication towards advancing the development of the malaria vaccine. Their relentless efforts signify the promise of a brighter future, one where the Malaria Vaccine Project stands as a beacon of hope.

There has been a fantastic calendar of events hosted by Rotary clubs this year and as we approach 'event season', I extend an earnest invitation to all Rotary clubs that are planning fundraising events, to consider the Malaria Vaccine Project as a deserving beneficiary. Our triumphs in this endeavour equate to the salvation of countless children's lives and the well-being of expectant mothers.

In this edition, we take immense pride in welcoming our Postdoctoral Scholar, Guilherme de Souza, hailing from Brazil. His expertise and prior involvement in malaria projects within his homeland, make him a valuable addition to the research team. Guilherme made a virtual appearance at the June meeting of the Malaria Vaccine Project Committee, allowing for an introduction, which was greatly received.

Looking ahead, our National Ambassador, the Honourable Anna Bligh AC, is preparing engagement activities interstate and we extend our best wishes as we continue to march forward in unison toward a malaria free future.

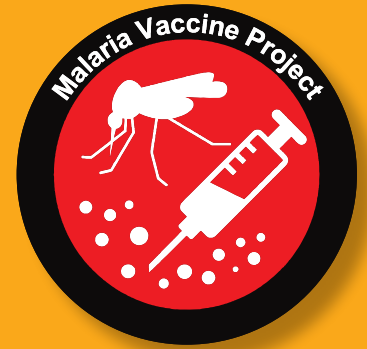
A Governance Committee was formed earlier this year, led by The Honourable Sam Doumany AM. This robust committee, including Neil Jones and Bruce Howlett, has convened on three occasions. Their knowledge and insights have ensured effective governance and strategic oversight. Further appreciation is extended to Neil Jones for meticulously maintaining our financial records, a role executed with great professionalism.

Ambassador Chair, Bruce Howlett, and his team have created interest, engagement and support, through virtual and in-person club attendance. Your tireless efforts have translated to funds directly injected at the laboratory bench.

I am delighted to report, total funds raised as at October 2023 is \$2,758,665!

We acknowledge and commend Jamie Endelman, Advancement Manager at Institute for Glycomics for his seamless integration and support of this critical research and our activities as a committee.

PDG Sandy Doumany



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RESEARCH UPDATE

Professor Michael F. Good AO DUniv

Head, Laboratory of Vaccines for the Developing World, Institute for Glycomics, Griffith University

We have had a busy 3 months as we enter a very exciting phase in the Program. As previously discussed, it is a requirement that all novel vaccine formulations for human use undergo a formal toxicological review to demonstrate that the vaccine is safe. This has been undertaken by Agilex. We can report that the rats in this study have received their final dose of vaccine and these animals will be sacrificed for histological analysis of their organs on October 6. When these have been analysed by a veterinary pathologist we will receive a report that will need to be included in the Investigator Brochure that will be submitted to the Human Ethics Committee in support of our planned human trial. In the meantime, we are developing the final protocol for the human trial.

Our planning for the human trial has been facilitated greatly by the installation of the WAVE Bioreactor which enables us to culture malaria parasites at scale in a fully closed system guaranteeing sterility and significantly enhanced output. This means that ultimately, we will not need to use as much blood to generate the vaccine and there will be a significant saving in the human labour required for making the vaccine. We were fortunate that the inventor of the Bioreactor, Professor John Dalton, who is also a long-term friend, came out from the University of Galway and spent two weeks in the lab establishing this methodology. We are grateful to the DVCR, Professor Lee Smith, and the University, for providing the significant funding required for this Bioreactor. Moving ahead we envisage multiple

WAVE Bioreactors being used to generate the large numbers of vaccine doses required for the Phase II and III trials. Associate Professor Danielle Stanisic has prepared a document outlining in more detail this exciting new technology.

We are looking forward to welcoming Dr Guilherme de Souza who arrives from Sao Paulo next week. Again, many thanks indeed to Graham Jones and Rotary for facilitating the Fellowship for Guilherme.

University of Oxford Vaccine

Many readers would be aware that there has been a recent announcement that a vaccine (R21) developed by the University of Oxford has now been recommended for use by the World Health Organization (WHO).

R21 is a sporozoite/liver stage vaccine developed by Adrian Hill and colleagues from Oxford. It aims to kill the malaria parasite before it enters the blood stream. It has a similar antigenic composition to the RTS,S, but uses a different delivery platform and a different adjuvant system. Phase II data have been published and presented at meetings and show between 70% and 80% protection from malaria up to 12 months. It has not been tested head-to-head with RTS,S, which has an efficacy of approximately 30%. Because R21 and RTS,S are sporozoite/liver stage vaccines, they are 'all or none' in terms of protection from clinical disease, as a single sporozoite that escapes from the immune net will give rise to full-blown clinical disease once the parasite enters the red cell phase.

However, if Phase III data prove to be as promising as the Phase II data, R21 will be a very welcome development for at-risk malaria communities. Phase III data have not been published.

The benefits of R21 would appear to be an enhanced level of protection (compared to RTS,S), and a cheap cost of manufacturing. A negative for R21 will be that it will not provide enduring protection as sporozoites (which are inoculated in very small numbers by the mosquito) will not provide sufficient antigen to boost the antibody response. Once the antibody level drops below a protective threshold, the only way to bring it up is with a booster dose of vaccine. It is not known how often the boosters will need to be given, but a rough guess would be every 12 months (before the rainy season). This is a concern that Adrian Hill agrees with.

Because R21 (and RTS,S) target the parasite in the liver, it offers complementary protection to that which we hope will be afforded by the Griffith PlasProtect vaccine, which targets the parasite in the blood. PlasProtect aims to limit blood stage parasite growth and reduce the disease impact of malaria. Looking to the future, PlasProtect could be administered with R21.



Pictured: Professor John Dalton, University of Galway and Sam O'Connor MP

BREAKING WAVES: Wave 25 Bioreactor System Sets a New Standard in Research Excellence

Associate Professor Danielle Stanisic
*Research Leader and Principal Research Fellow
Institute for Glycomics, Griffith University*

One of the perceived challenges associated with our malaria vaccine is the ability to scale-up vaccine manufacture from our small-scale studies (<10 volunteers) to larger studies, which begins with our upcoming Phase I trial. To-date, for vaccine manufacture, our process for culturing blood-stage malaria parasites in our cleanroom is similar to what is done in most research laboratories. This involves growing the parasites in tissue culture dishes (see *image below*).



During the expansion phase of our vaccine manufacturing process, we grow the parasites in human red blood cells (hRBC) in these dishes and feed them frequently with special tissue culture medium. They are kept in a 37°C incubator and receive a special mixture of gasses (carbon dioxide, oxygen and nitrogen) to keep them happy. Every 2 days we have to remove the parasites from the dishes and dilute them out using more hRBC because if there are too many parasites in one dish, they become

unhappy and die. This means that the number of dishes increases over time. We typically process 12-16 of these large dishes at a time to make the parasite material for the vaccine. This is very labour-intensive and due to the frequent handling during this entire process, we must be very careful not to introduce any sort of contamination to the dishes. This contamination would be detected during our rigorous testing process and would result in all the parasite material from that process being discarded.

We were very fortunate to recently receive some strategic funding from Griffith University to purchase a "WAVE 25 bioreactor system".



Here, parasites are grown in a plastic bag that is fitted with various connections to make feeding parasites a time-efficient and straightforward process. We can remove and replace the culture media without having to remove the parasites from the bag. The bag sits on a rocking platform that is

heated to 37°C and receives the same special mixture of gases mentioned above. This system allows us to easily scale up vaccine manufacture – we can theoretically grow in a single large bag up to 5x what we currently grow in 12 dishes. Using this system also greatly limits the possibility of contamination. Further scaling up the process could be achieved by using multiple WAVE 25 bioreactor systems.

Recently, we were very fortunate to host Professor John Dalton (University of Galway) in our laboratory at the Institute for Glycomics. In 2012, he published a paper describing for the first time, the use of the WAVE 25 bioreactor system, to culture blood-stage malaria parasites. During his visit, he spent time training our staff so that we can use this system to manufacture the vaccine for the upcoming Phase I trial. We are very grateful for his time and expertise.



Professor John Dalton, University of Galway

STOP PRESS:

Nearly every minute, a child under five dies from malaria. Many of these deaths are preventable and treatable. In 2021, there were 247 million malaria cases globally that lead to 619,000 deaths in total.

Of these deaths, 77% were children under 5 years of age. This translates into a daily toll of over 1,000 children under age 5.

– UNICEF



BEHIND THE MICROSCOPE LENS

RESEARCHER SPOTLIGHT

Hamidreza Sagedh

Research Fellow, Institute for Glycomics

Tell us about you!

When did you join the Institute for Glycomics?

My name is Hamidreza Sadegh, and I have completed my PhD at the University of Technology Sydney, where I recently submitted my doctoral thesis. My academic background includes a Bachelor's and Master's degree in Microbiology. During my doctoral studies, my research focused on investigating the relationship between the gut microbiome and cerebrovascular diseases.

Throughout my academic journey, I became particularly intrigued by the study of cerebral malaria, finding it to be an exceptionally captivating subject. I joined the Stanisic Group in early July of this year. I am enthusiastic about the opportunity to expand my knowledge in this field and contribute as a small part of an effort towards a malaria-free future.

Why Science?

Studying science presents considerable challenges, and a genuine love for the subject, particularly biology, is essential for making meaningful progress and continuous improvement. For me, pursuing science was not a mere choice; it was driven by a deep-seated passion. There's nothing quite like the thrill of having the opportunity to uncover something previously unknown, akin to discovering uncharted territory. To me, science isn't just an academic field of study; it embodies a profound and abiding love.

What are your interests outside of work?

Out of science and work, I am a big fan of outdoor activities like hiking, camping and mountain climbing.



What is your role in the malaria vaccine project?

I am currently engaged in a research project funded by the National Institutes of Health (NIH) to develop a multi-component vaccine designed to elicit a robust immune response against the blood stage of Malaria. My work involves experimenting with various preclinical malaria models to ascertain the most effective combination of components and determine the optimal dosage required to generate the strongest immune response.



BEHIND THE MICROSCOPE LENS

RESEARCHER SPOTLIGHT

Zac Doan

Research Assistant, Institute for Glycomics

Tell us about you!

When did you join the Institute for Glycomics?

My journey into the realm of anti-malarial research began prior to joining the esteemed Institute for Glycomics. I was fortunate to be part of the Rogerson lab, under the mentorship of Prof Siddhartha Mahanty, Prof Stephen Rogerson and Dr. Matthew Dixon. There, I focused on the immune-recognition capacity and biology of an innovative malaria vaccine candidate. The Malaria Vaccine Project piqued my interest during this period, and I was fascinated by their novel approach to vaccine development.

Why Science?

My insatiable curiosity led me to the world of science. It's an expansive and boundless field, offering a unique opportunity to probe into research areas that remain unexplored. The thrill of devising strategies to navigate and gain insights into these unknown territories is incredibly fulfilling. Furthermore, the joy of translating our findings into tangible solutions that improve our everyday life is truly rewarding.

What are your interests outside of work?

When I step away from my professional duties, I immerse myself in a myriad of disciplines, aiming to be a polymath, even if it means not mastering any. I enjoy exploring my new city on my bike, dabbling with AI image modelling tools, crafting data analytics code, scrutinizing finance reports, and indulging in cinema and music.



What is your role in the malaria vaccine project?

My role in the Malaria Vaccine Project is a fascinating mix of monitoring the activities of malaria parasites, ensuring they are well-nourished, and maintaining their optimal growth conditions. I am also responsible for managing the cleanliness and overall safety of the research lab.



INTRODUCING OUR ROTARY SUPPORTED POSTDOCTORAL SCHOLAR

Greetings, everyone.

I am Guilherme de Souza, and I am delighted to have the opportunity to join the esteemed Malaria Vaccine Project team. To provide some context, I was born in the small town of Bernardino de Campos in São Paulo, Brazil. My academic journey began in 2012 when I started my undergraduate studies in Biomolecular Physics, culminating in both a master's and a Ph.D. in the same field. Throughout my graduate studies, I focused on a cause close to my heart: the development of drugs to combat malaria. My doctoral research took place at the Institute of Physics of São Carlos (IFSC), part of the University of São Paulo (USP) in São Carlos. There, I delved deeply into malaria-related research, particularly exploring the antiplasmodial effects of various chemical classes, including marinoquinolines, on the malaria parasite.

Following the completion of my Ph.D., I had the opportunity to collaborate as a post-doctoral fellow with the public-private partnership Medicines for Malaria Venture. My contributions spanned two critical fronts: i) advancing our understanding of the antiplasmodial properties of multiple chemical series and ii) monitoring the effectiveness of current antimalarials, such as mefloquine and chloroquine, against parasites extracted directly from sick patients. The study of currently circulating parasites provides invaluable data, and enables us to proactively detect trends in potency loss that could have clinical implications.

After a year on this project, I embarked on a quest for international opportunities to further enrich my academic portfolio, leading me to discover the Malaria Vaccine Project. The idea of continuing to work with malaria, but now focusing on patient immunization, greatly appealed to me, and the recent COVID-19 pandemic highlighted the importance of vaccines even more. In 2022 alone, my home country, Brazil, faced a significant challenge with 128,000 registered cases of malaria, placing strain on its healthcare system and exacerbating existing public health and economic issues. Many other countries burdened by malaria face similar situations, and the development of an effective malaria vaccine would greatly benefit them. Personally, I firmly believe that my expertise in cultivating malaria parasites (honed during my graduate work) and my proficiency in statistical analysis (due to my background in exact sciences) can be of great value to this project.

I am genuinely enthusiastic about becoming a part of the Malaria Vaccine Project team and look forward to contributing to our shared mission.



Please help us with any donation that you can.

Any Donations must be made through our website (RAWCS):

malariavaccineproject.com

If you need any help, would like to learn more about the Malaria Vaccine Project or want anyone to speak to your club, please contact either Graham or Bruce.

With warm wishes and our sincere appreciation for all your help with this special project.



SPRING LUNCH!

Order of Australia Association

The Spring Lunch for the Order of Australia Association organised by the new Gold Coast Region Convenor PDG Sandy Doumany OAM was held at the Sanctuary Cove Golf Club on the 21st September.

The Gold Coast Region has not been active since pre Covid and 49 attendees celebrated the revival of the group.

Professor Michael Good AO was the Guest Speaker on the day, and gave a history and progress of the Malaria Vaccine Project which at the end encouraged many questions from the floor.

As always, a new audience are amazed that this research is being done at Griffith University on the Gold Coast, and had no idea of the numbers of deaths of children and pregnant women.



CHARITY RACE DAY!

For all those who attended **The Rotary Club of Surfers Paradise Charity Race Day** on the 7th October it was a most enjoyable day.

Lots of very smartly dressed men and women arrived, many debonair men complete with hats, and ladies who just stepped out of Vogue.

Despite the showers the races went ahead, and many braved the elements to cheer their jockey on, with lots of happy smiling faces.

Table 6, headed by Professor Michael Good was the lucky table, Marisa Hobart winning the best dressed female prize, Charmaine Ward with 2 tickets purchased, won two great prizes and Sam Doumany was successful bidding for a Patchwork Quilt donated by Wattle Quilters.

The approximate net profit for the day was \$8500 with the Gold Coast Hospital and the Malaria Vaccine Research Project the fortunate beneficiaries. Representatives from the Gold Coast Hospital and the Malaria Vaccine Research Project were in attendance.

Thank you for all the hard work by the members of the Surfers Paradise Rotary Club for a wonderful function.

We recommend you attend in 2024 for a great Rotary Day and supporting local Charities.



Q&A

WITH BRUCE HOWLETT

Does Australia experience cases of malaria?

Australia was declared malaria-free in 1981, which means we do not have localised transmission or "spread" of malaria. In saying that, we do have mosquitoes in the Northern parts of Australia that are capable of transmitting the malaria parasite. We also have up to 800 imported cases of malaria every year. These are individuals who have contracted malaria while on holidays or business in malaria endemic areas.

Can Malaria be cured?

Malaria can be cured. If a person is suspected of having malaria, it is important that the diagnosis is confirmed early, followed treatment. Different tests can be used to confirm this diagnosis. These include a Rapid Diagnostic Test, a blood smear and a more sensitive test known as a PCR test which can detect very low levels of parasites in the blood

Can Malaria re-occur?

This depends on which species of the malaria parasite you are infected with. The majority of human malaria parasites, including the most deadly species, Plasmodium falciparum, can be successfully treated with drugs that kill the parasites in the bloodstream and in these instances, malaria will not reoccur. Two species of malaria parasite, P. vivax and P. ovale, have latent forms ("hypnozoites") that can persist in the liver. Treatment with specialised drugs such as primaquine or tafenoquine is needed to kill these liver forms and prevent reoccurrence weeks or even months after the initial bout of malaria.

Could Malaria become endemic in Australia once again?

The answer is most definitely, yes. In Northern parts of Australia we have mosquitos that can spread the malaria parasite. It would only take an unknown infected person to be bitten by a suitable mosquito the spread is possible. Parts of the US have recently recorded an increase in local cases of malaria due to this.

How can I prevent contracting Malaria if I travel overseas?

If you are travelling to a Country with known cases of malaria, it is important that you consult with your Medical Practitioner who will almost certainly prescribe a suitable medication to be taken, before, during and after you return to Australia.

Could Malaria be eliminated from the World one day?

Just like Polio it is possible. It will require suitable well managed vaccination programs combined with current practices such as prompt diagnosis and treatment of infection, the use of insecticide impregnated mosquito nets and continued indoor insecticide spraying of dwellings and water ways.

FINANCIAL UPDATE

NEIL JONES

The new financial year has commenced on a positive note with \$200,470 added to our fundraising total in the September 2023 Quarter taking our total funds raised to \$2,758,665.

Calendar year 2023 began slowly but the challenge to raise \$140,000 which with matching funds from Griffith University would fund a Postdoctoral Fellowship, provided a new impetus and \$302,100 has been raised in the nine months to 30 September.

Pleasingly, funding for the Postdoctoral Fellowship is now fully in place with The Rotary Foundation providing the final \$42,660 by way of a global grant.

Source of Funds

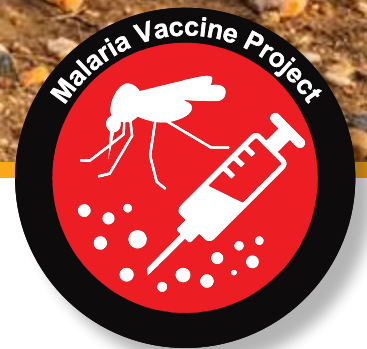
Rotary District 9640 Clubs and Individual Rotarians	\$421,314
Other Australian Rotary Clubs and related	250,447
International Rotary Clubs, The Rotary Foundation & related	55,839
Total Rotary	\$727,600
Individual Donors	714,515
Private Trust	210,000
Corporate	35,000
	\$1,687,115
Gold Coast 2018 Legacy Committee	50,000
Australian Government Medical Futures Fund	500,000
Griffith University Matching Funds	521,550
	\$2,758,665

Rotary Club Contributions

Twelve Australian Rotary Clubs have donated over \$10,000 led by Hope Island with a magnificent \$120,514. The other clubs are:

Hornsby	\$35,628
Surfers Paradise	\$34,697
Gold Coast	\$25,638
Engadine	\$20,000
Goolwa	\$18,892
Broadbeach	\$18,000
Mermaid Beach	\$18,000
Murwillumbah	\$15,000
Southport	\$15,000
Mackay West	\$12,000
Canberra	\$10,010

Those 12 Rotary Clubs which have contributed a total **\$343,379** are deservedly recognised on The Institute of Glycomics Honour Boards.



OUR PARTNERS



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